A REMOTE SENSING EXTRACTION METHOD FOR GARLIC DISTRIBUTION IN PIZHOU CITY USING GEE CLOUD PLATFORM

JIANGSU NORMAL UNIVERSITY NJTECHSJ1@163.COM
Jin Shi , Liang Liang

ABSTRACT

In this paper, using Pizhou city as the study area, based on Google Earth Engine (GEE) cloud platform and Sentinel-2 data, training samples were identified by visual interpretation and fieldwork, and typical crops in the study area were classified by three classification methods, which were constructed by index features and spectral features.

INTRODUCTION

In recent years, the industrial scale of garlic in China has been expanding, and the price of garlic fluctuates more frequently, which is very unfavorable to the healthy development of the garlic market and makes garlic farmers less motivated to plant garlic. Therefore, it is of great importance to obtain accurate information on garlic planting area, price and production for the government to adjust agricultural policies, regulate garlic prices and stabilize the garlic market.

OBJECTIVE

The remote sensing method has the advantages of large coverage area, short replay period and complete information of acquired features in extracting garlic planting area, but the disadvantage of remote sensing so far is that garlic is easily confused with other features, which will affect the accuracy of the final acquired area. Therefore, the problem of accuracy in the process of remote sensing extraction of garlic cultivation area becomes the focus of the research process.

METHODS

In this paper, we extract four typical crops as sample points through visual interpretation and fieldwork, namely, garlic, winter wheat, water bodies and buildings. Firstly, we classify them by three classification methods, namely, random forest, support vector machine and classification regression tree, and calculate the accuracy. Then, we obtain the crop feature information for classification and obtain the accuracy through the construction of index features and spectral index features, so as to improve the accuracy of remote sensing in feature extraction.

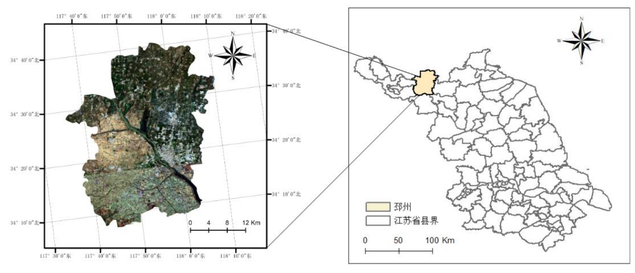

Figure.1 Overview of the study area location

A:Garlic B:winter wheat C:water bodies D:construction

Figure.2 High-resolution remote sensing images of garlic and other landforms

RESULTS

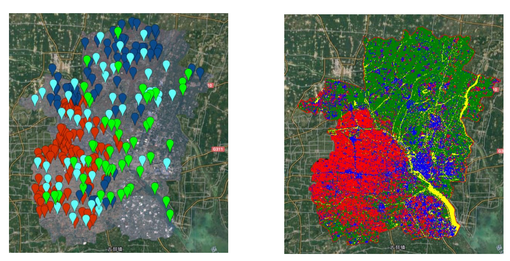

Figure.3 Sample point classification chart

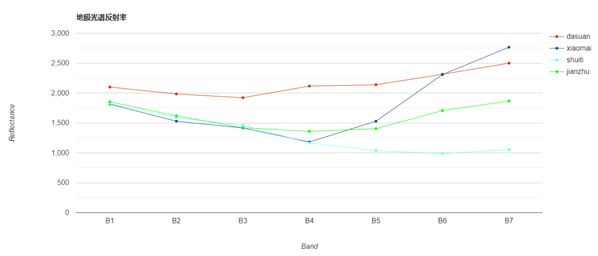

Figure.4 Spectral reflectance maps of four different features from October to November

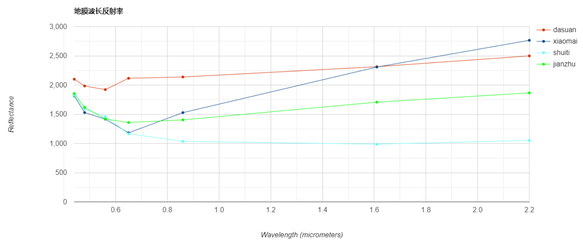

Figure.5 Wavelength reflectance maps for four different features from October to November

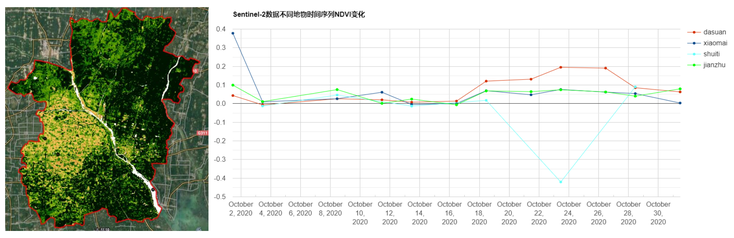

Figure.6 NDVI of four different features

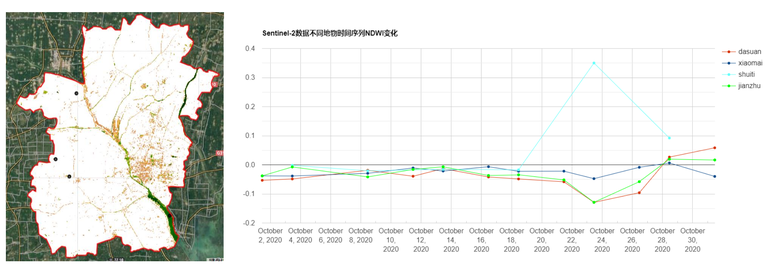

Figure.7 NDWI of four different features

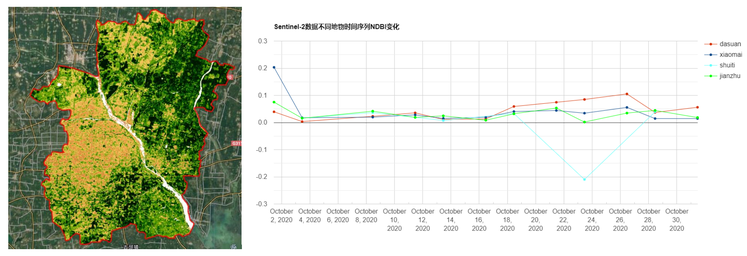

Figure.8 NDBI of four different features

The random forest algorithm has obvious advantages over other algorithms, and the overall accuracy of the random forest algorithm is 3.74% and 8.72% higher than the other two algorithms, and the kappa accuracy is 5.33% and 12.23% higher than the other two algorithms, respectively, in the feature classification study.

CONCLUSION

In summary, four typical crops were extracted as sample points through visual interpretation and fieldwork. Three classification methods, random forest, support vector machine and classification regression tree, were firstly used to classify the crops and calculate the accuracy rate, and then the crop feature information was obtained by constructing index features and spectral index features for classification to obtain the accuracy rate. The final conclusion was that the random forest method was the best for garlic classification extraction.

MAJOR REFERENCE

- Maxwell A.E.,Waner T.A, Fang F Implementation of machine-learning classification in remote sensing: an applied review [J].International Journal of Remotesensing,2018.39(9):2784-817.
- Zhang c, Wang T.J,Atkinson PM， PeterM,PanXin,HuapengLi, A novel multi-parameter support vector machine for image classification[J]. International Journal of Remote Sensing,2015,36(7):1890-1906.
- Tucker C J.1979.Red and photographic infrared linear combinations for monitoring vegetation. Remote Sensing of Eovironment,8(2): 127-150.
- Wu Guojing. Research on the scale of garlic cultivation and its influencing factors [D]. Shandong Agricultural University,2019.
- Shi Zhou,Liang Zongzheng,Yang Yuanyuan,Guo Yan. Current status and prospect of agricultural remote sensing research[J]. Journal of Agricultural Machinery,2015,46(02):247-260